DOCUMENT RESUME

ED 368 144 EC 302 905

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TITLE World Geography Instruction to Gifted Minority Students Using Mnemonics versus Lecture: A Single-Subject Inquiry.
PUB DATE 16 Oct 93
NOTE 24p.; Paper presented at the Conference of the Rocky Mountain Education and Research Association (October 16, 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classroom Techniques; Comparative Analysis; Elementary Education; Elementary School Students; *Geography; *Gifted; *Instructional Effectiveness; Learning Strategies; *Lecture Method; Memorization; *Minority Groups; *Mnemonics; Resource Room Programs

ABSTRACT

This study examined whether mnemonics or lecture was a more effective teaching technique in the instruction of world geography facts to eight gifted minority students (grades 2-5) in a pull-out program. An alternating treatment design was used. The inquiry was divided into two phases, mnemonics and lecture. A total of eight sessions were interspersed among 17 instructional periods. Results showed the mnemonics technique was more effective than the lecture technique. (DB)

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World Geography Instruction to Gifted Minority Students Using Mnemonics versus Lecture: A Single-Subject Inquiry

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Abstract

The purpose of this inquiry was to determine whether mnemonics or lecture was a more effective teaching technique in the instruction of world geography facts within a B-level, pull-out, gifted, minority program. This instruction was essential because the pull-out program prevents these students from receiving social studies and science instruction in their regular classes, which could result in lower grades and test scores in these areas. An Alternating Treatment Design (ATD) was used to provide a quicker comparison between the two teaching techniques selected, mnemonics and lecture. The inquiry was divided into two phases, mnemonics and lecture respectively. Results supported the hypothesis by showing that mnemonics was a more effective teaching technique than traditional lecture in the instruction of world geography facts. The students also seemed to enjoy the mnemonics phase more. Mnemonics as a teaching technique will be used more in the future in this B-level, pull-out, gifted, minority program.

World Geography Instruction To Gifted Minority Students Using Mnemonics
Versus Lecture: A Single-Subject Inquiry

The given study was selected to be used within a B-Level pull-out gifted, minority program. This program was designed to pull out gifted, minority students from their regular classes during science and social studies. This situation had resulted in a lack of science and social studies instruction for these gifted, minority students. Using an alternating treatment design (ATD), the researchers hypothesized that mnemonics would be a more effective teaching technique than traditional lecture in the instruction of world geography facts. An ATD was chosen because of its ability to provide a quicker comparison of the effectiveness of the selected teaching techniques, mnemonics and lecture. Due to the small population of gifted, minority students in the given rural area, a Single Subject Inquiry was necessary, using one class of eight students as the population (N=1). The chosen design also allowed the flexibility of modifying the teaching techniques to be used during the course of instruction, thus increasing the desired observable behavior (Stile, 1991).

This program serviced many different grade level gifted, minority students, therefore a traditional science or social studies textbook targeted at one grade level was not appropriate. This was one of the reasons for selecting mnemonics and lecture as the teaching

techniques in the instruction of world geography facts. These techniques were intended to promote critical thinking and provide outside resources to stimulate the learning process. According to Van-Poolen-Larsen (1991), the promotion of critical thinking and providing outside resources to stimulate the learning process is essential in any gifted, minority program.

A second reason for selecting mnemonics and lecture was to support the hypothesis that mnemonics would be a more effective teaching technique than traditional lecture in the instruction of world geography facts. According to Blankenship (1989), there is a lack of geographical literacy in the United States and the use of mnemonic devices is one way of helping students to remember geography facts. Due to the use of mnemonics, students perform significantly better on both immediate and delayed chapter tests than with the use of traditional lecture (Mastropieri & Scruggs, 1989).

Because of the concern that the given B-level pull-out program deprived the gifted, minority students of science and social studies, it was imperative that science and social studies instruction be provided to these students. Without such instruction, tests scores and grades for these students in the areas of science and social studies may fall, which would disqualify them from the gifted, minority program.

A survey of state of directors of gifted, minority programs conducted by Patton (1990), found that culturally

diverse and low socioeconomic gifted students are adversely impacted academically due to a lack of incorporation of programs that served their needs. According to Adams (1990), program opportunities for gifted, minority students were not readily available. The program within this inquiry provided opportunities for gifted, minority students and the researchers felt that such opportunities must continue to be provided.

The purpose of this study was to determine whether using mnemonics or lecture was a more effective teaching technique in the instruction of world geography facts.

Method

Subjects

Eight subjects were chosen and treated as a single group from a B-Level pull-out gifted, minority program in a rural, Hispanic dominant school within a rural, Hispanic dominant district. S-A was a Hispanic female in fifth grade; S-B was an Anglo male in fifth grade; S-C was an Anglo male in fifth grade; S-D was a Hispanic female in fifth grade; S-E was a Hispanic male in fourth grade; S-F was a Hispanic female in fourth grade; S-G was a Hispanic female in third grade; and S-H was a Hispanic male in second grade.

Material

An unlabeled world map was provided to the students as a pre-test before instruction. This map was flat and outlined the geographic boundaries of the countries. This map was derived from

a map by Rand McNally (1985). Students were asked to label as many topographical areas, countries, and continents, oceans, and seas as they could. A new copy of the same map was given to the students each session and they were asked to label as many topographical areas, countries, and continents, oceans, and seas as they could. Only the newly presented material (three geography facts per category) was graded on a session by session basis. Cumulative learning was assessed through post-test observations to determine overall gain of geography facts as well as the gains using mnemonics and the gains using lecture. See Appendix A for map.

Procedure

The geography facts were selected from three categories: (a) topography; (b) countries; and (c) continents, oceans, and seas. Topography included the following: Rocky Mountains, Appalachian Mountains, Andes, Great Sandy Desert, Gibson Desert, Great Victoria Desert, Simpson Desert, Sahara, Atlas Mountains, Kalahari Desert, Gobi Desert, Himalayas, Syrian Desert, Urals, Alps, Caucasus Mountains, Altai Mountains, Greater Khingan Mountains, Kunlun Mountains, Namib Desert, Arabian Desert, Nubian Desert, Libyan Desert, and Great Dividing Range.

Countries included the following: Soviet Union, Canada, China, United States, Brazil, Australia, Argentina, Sudan, Algeria, Zaire, Greenland, Saudi Arabia, Mexico, Indonesia, Libya, Iran, Mongolia, Peru, Chad, Niger, Angola, Mali, and South Africa. The Soviet Union

was taught as a single country even though it is not currently considered one country. This was done because the instructional information obtained was not based on the recent political developments within the area of the Soviet Union (Rand McNally, 1973).

Continents, oceans and seas included the following: Asia, Africa, North America, South America, Antarctica, Europe, Australia, Pacific Ocean, Atlantic Ocean, Indian Ocean, Arctic Ocean, Mediterranean Sea, South China Sea, Bering Sea, Caribbean Sea, Gulf of Mexico, Sea of Okhotsk, East China Sea, Yellow Sea, Hudson Bay, Sea of Japan, North Sea, Black Sea, and Red Sea.

Although the ATD that was used did not require a baseline, a pre-test was given to determine the gifted, minority students prior knowledge of world geography facts. A post-test was also given after the mnemonics phase to determine the gain in world geography facts using mnemonics. This was done by only scoring the correct labels for geography facts that were presented during the mnemonics phase. Another post-test was given after the lecture phase to determine the gain in world geography facts using lecture. This was done by only scoring the correct labels for the geography facts presented during the lecture phase. A final post-test was given to determine the overall gain of knowledge of world geography facts and to ensure that the instruction provided was independent of the gifted, minority students previous knowledge of world geography facts. A total of eight sessions were interspersed among 17

instructional periods of an hour and a half each and were presented in two phases, mnemonics and lecture.

During phase one mnemonics was used as the teaching technique. The categories were randomly counterbalanced for each session to determine the order in which the instruction would be provided. Instruction for each category was not to exceed 20 minutes. Instructors were also counterbalanced. A co-researcher provided instruction during sessions two and four of phase one. The co-researcher also scored the map quizzes for these sessions. It had been predetermined that credit would be given for labels that were in approximately the proper location and identified but not necessarily spelled correctly. The student scores of correctly labeled world geography facts were summed to obtain the total points earned which was divided by the total possible points to arrive at the percent correct for the class for each session. Some examples of the mnemonics used were as follow: Rocky Mountains-its rocky road from Alaska to New Mexico; Pacific Ocean-people act crazy if found in California; and, Sahara-sand and heat all round Africa. Phase one consisted of four sessions at which time it was determined through the visual examination of the graphic representation of the percent correct that the use of mnemonics had established a trend. Therefore, phase two was initiated using lecture as the teaching technique.

During phase two, the categories were randomly counterbalanced as they were in the previous phase. Again instruction for each

category was not to exceed 20 minutes. Instruction was also counterbalanced as it was in the previous phase during sessions five and seven. The map quizzes were also scored in the same manner as the previous phase. Some examples of lecture included the following: Urals mountains-in Europe, within the Soviet Union, to the west of the border of Asia; Caribbean Sea-above South America, near Central America and South of the United States; and, Syrian Desert-in Asia, northern part of Saudi Arabia, which is near Iran and north of the Indian Ocean. Phase two consisted of four sessions at which time it was determined through the visual examination of the graphic representation of the percent correct that the use of lecture had established a trend.

Results

Graphic representation shows that mnemonics as a teaching technique is more effective than lecture based on the comparison of the means of the percent correct in the phase in which each was used. Pre- and post-test data shows that there was an overall gain of world geography facts for the gifted, minority students. The greatest gain was in the category of countries and the least gain was in the category of topography. Comparing the post-test data for the mnemonics and lecture phases also shows that mnemonics is a more effective teaching technique than traditional lecture in the instruction of world geography facts. Unfortunately, due to time constraints, it was not possible to conduct a third phase using mnemonics a second time to strengthen support for the hypothesis

that it is a more effective teaching technique than traditional lecture in the instruction of world geography facts.

Insert Figures I - VI about here

Interrater-reliability

Interrater-reliability checks were conducted by the co-researcher during the counterbalancing of instruction. A point-by-point method of determining interrater-reliability was used by taking the number of correct geography labels in agreement divided by agreements plus disagreement times 100. Results of the interrater-reliability checks were 3/3 for all three categories equalling 100% for all sessions checked, which included sessions two, four, five and seven.

Discussion

As hypothesized, mnemonics as a teaching technique for the instruction of world geography facts is more effective than lecture based on the means of the percent correct in the phase in which each was used. Post-test data also supported the hypothesis. Even though the students did not meet the target criteria, the researchers feel that the students overall gain in world geography facts is very beneficial. It was also the observation of the researchers that the students enjoyed the mnemonics phase more than the traditional lecture and even developed their own mnemonics. One student

developed the mnemonic: A nincompoop decides everything stupid, for the Andes mountains. If time had permitted, the researchers would have initiated a third phase using mnemonics to strengthen the support for the hypothesis. More research should be done in this area and should include a third phase using mnemonics if at all possible.

During the course of the inquiry the ATD used actually turned out to be more of a BC model comparing two instructional techniques, mnemonics and lecture. Also it must be noted that the researchers felt that the information on world geography facts provided in the earlier part of the inquiry was more well known. For example the seven continents were presented during the first three sessions and even though the students might not have known where these continents were, the names of the continents were familiar to them. The information on world geography facts provided in later sessions was not as familiar. Similarly, the information instructed within the topography category was not as familiar to the students as the other categories which might explain why the students experienced the least overall gain of world geography facts in this category. Although, this might also be explained by the fact that the map used did not outline the topographical areas as it did the countries. The novelty of the inquiry also seemed to wear off. During the first few sessions the students were excited and looked forward to the sessions but as time went on they were not as excited and even

dreaded the sessions. During the lecture phase the students seem to miss using the mnemonics and had a hard time understanding why mnemonics were no longer being used. This might have contributed to their loss of interest in later sessions. It would be interesting to see how the students would react in an inquiry where the lecture phase was presented before the mnemonics phase.

Based on the results of this inquiry the researchers would use mnemonics again in the future, not only for the instruction of world geography facts but other information as well. More research should be conducted in the use of mnemonics in areas other than world geography facts.

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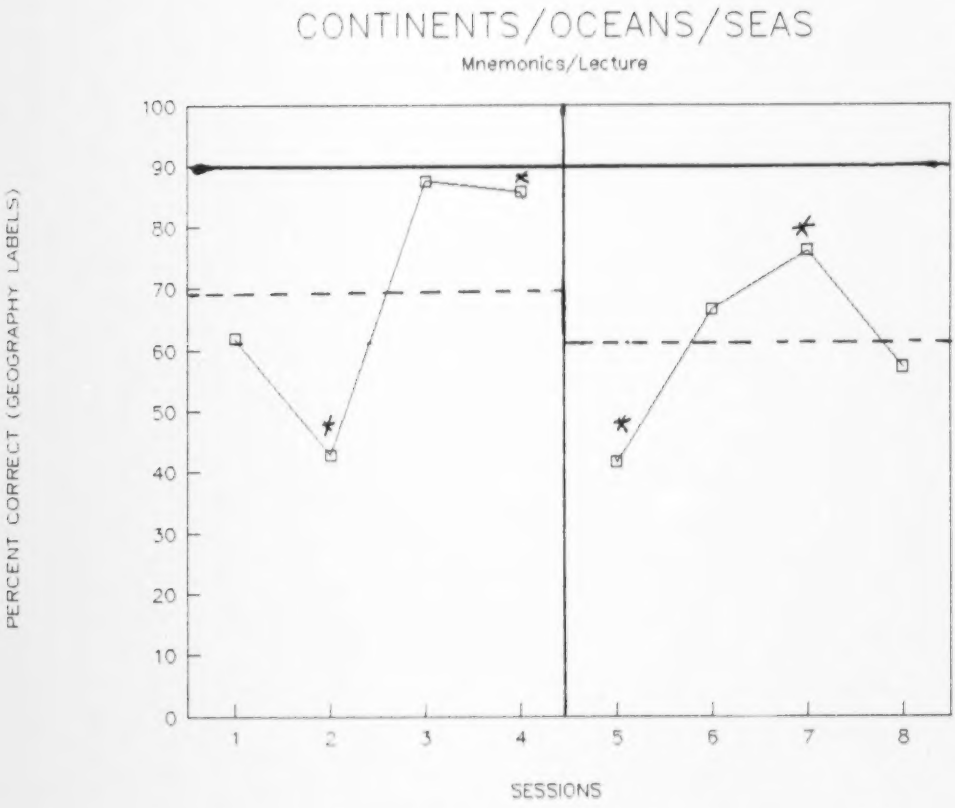

Figure 1. Means of trend lines within the mnemonics and lecture phases for continents/oceans/seas.

Trend lines
Means
Reliability checks
Target criteria

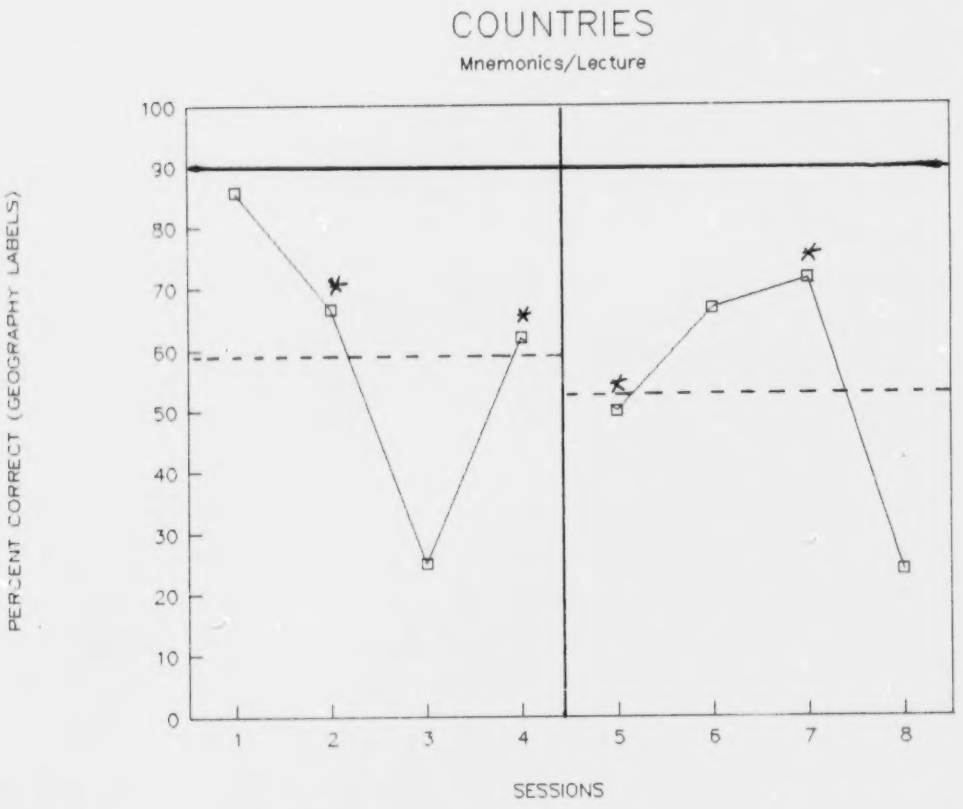

Figure II. Means of trend lines within the mnemonics and lecture phases for countries.

Trend lines
Means
Reliability checks
Target criteria

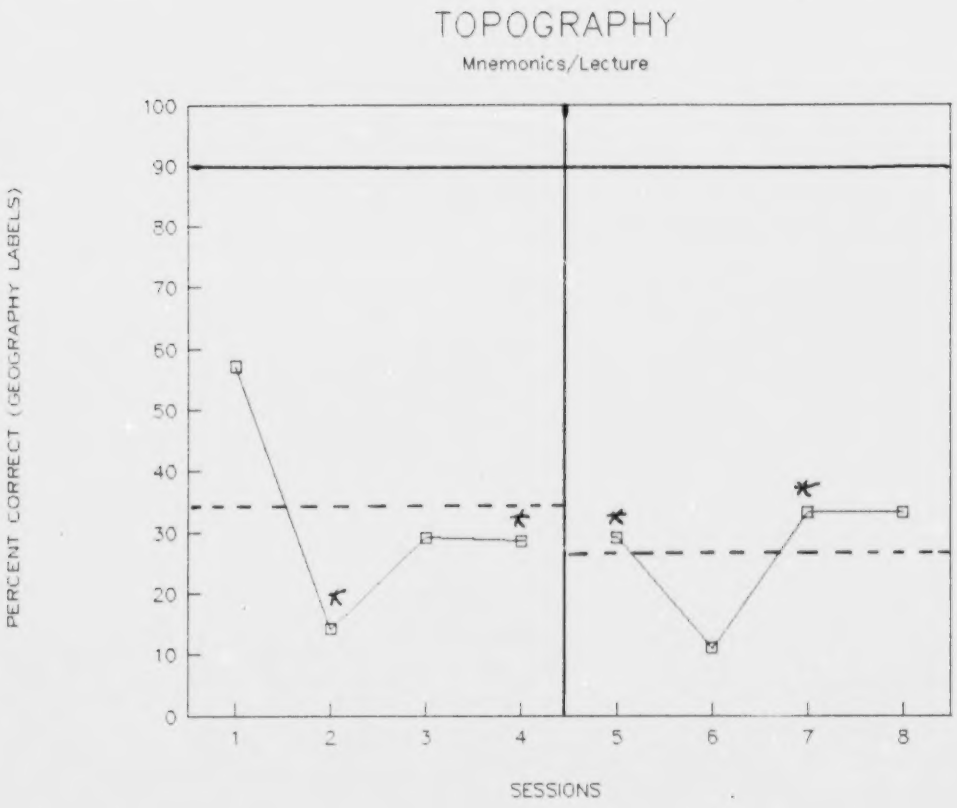

Figure III. Means of trend lines within the mnemonics and lecture phases for topography.

Trend lines
Means
* Reliability checks
— Target criteria

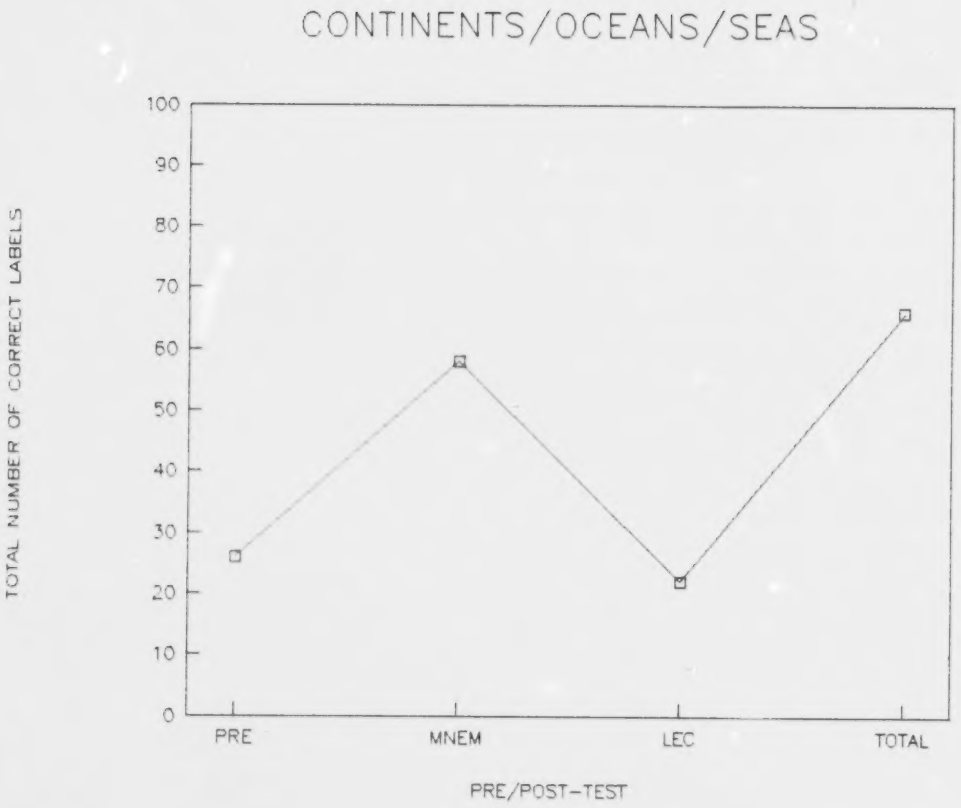

Figure IV. Pre/post-test data for continents/oceans/seas.

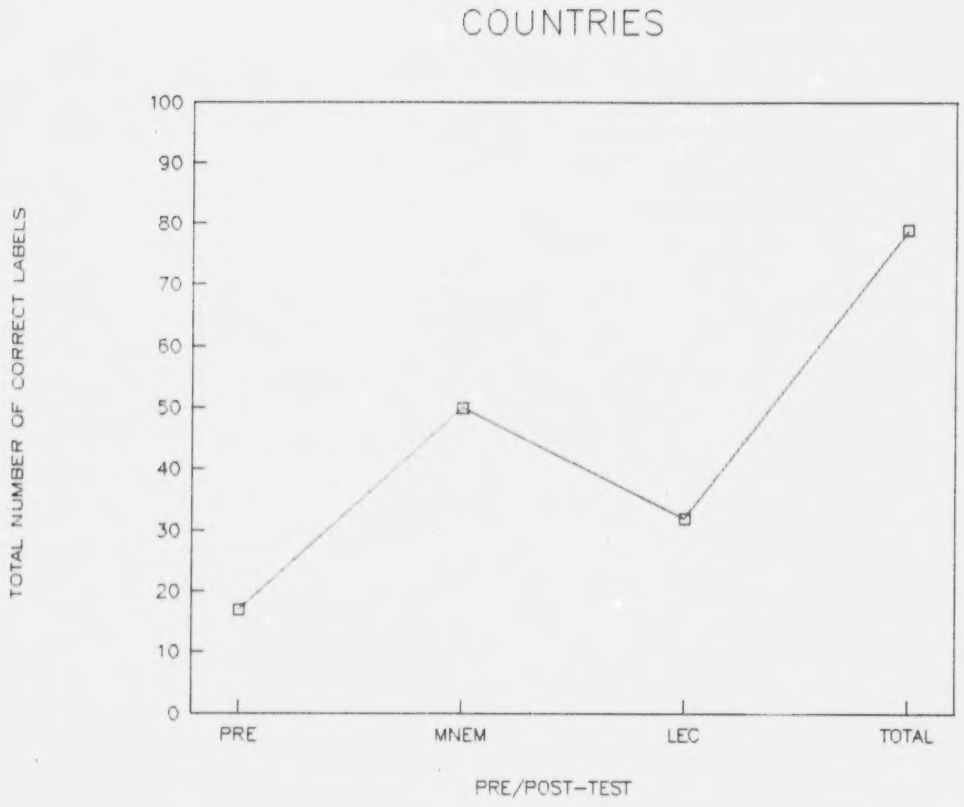

Figure V. Pre/post-test data for countries.

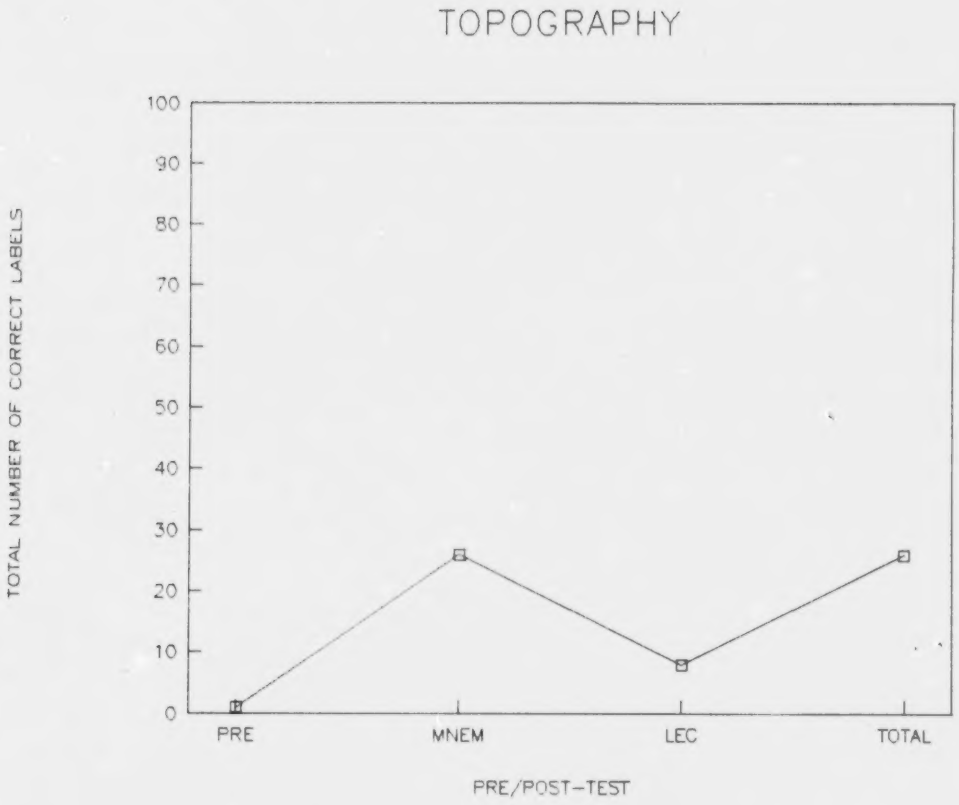

Figure VI. Pre/post-test data for topography.

Appendix A

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